PROGRESS REPORT OF WOLF POPULATION MONITORING IN WISCONSIN FOR THE PERIOD OCTOBER 2004 - MARCH 2005

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ABSTRACT

The Wisconsin Department of Natural Resources (DNR) has annually monitored the state population of gray wolves (*Canis lupus*) since 1979 using radio telemetry, snow track surveys, and collection of reports of wolf observations. Wolves were removed from the state list of endangered and threatened species in summer 2004, but the federal government re-listed wolves from federally threatened to endangered on 31 January 2005 due to the decision of a federal court. A minimum count over winter 2004-2005 consisted of 425 to 455 wolves in 108 packs and 14 loners. A total of 414 to 442 wolves occurred outside of Indian reservations, thus representing the second year of the wolf population at or above its goal of 350 wolves in the state outside Indian reservations. The state wolf population increased by 14% from last year's population of 373 wolves. Mean winter home range for 27 adult wolves was 37 mi^2. Total occupied range of territorial

wolves was 6374 mi^2, that was occupied at a density of about 1 wolf / 14 mi^2. An estimated 118-192 pups were present in late winter with mean survival rate of 31%.

INTRODUCTION

The gray wolf (*Canis lupus*) was extirpated from Wisconsin in the late 1950's following a state bounty program that lasted from 1865 to 1957 (Thiel 1993). Elimination of the bounty in Wisconsin (1957), Michigan (1960) and Minnesota (1965), as well as endangered species designations, allowed wolves to recolonize Wisconsin in the mid 1970's (Wydeven et al. 1995). The state of Wisconsin listed the gray (timber) wolf as a state endangered species in 1975, and began formal population monitoring in 1979 (Wydeven et al. 1995). Intense population monitoring of wolves was considered an important management strategy in the 1989 recovery plan (Wisconsin DNR 1989), and the 1999 state wolf management plan (Wisconsin DNR 1999).
Wolves were reclassified as a state threatened species on 1 October 1999. On 1 August, 2004 the gray wolf was removed from the state list of threatened and endangered species, and was listed as a protected wild animal.

The U.S. Fish and Wildlife Service listed the eastern gray wolf as an endangered species in 1967 and again in 1974 under the 1973 Endangered Species Act (U.S. Fish and Wildlife Service 1992). Wolves were reclassified to threatened in 1978 in Minnesota. Wisconsin, Michigan and the remainder of the Eastern Distinct Population Segment were downlisted to threatened on 1 April 2003. A population of 100+ wolves in Wisconsin and Michigan for 5 or more years and a stable population in Minnesota were criteria for delisting the Eastern DPS. The combined state populations have exceeded 100 wolves for Wisconsin and Michigan since 1994, and currently there are at least 800 wolves; thus have been at the 100+ goal for 12 years. The federal delisting process for the Eastern DPS of gray wolves began in summer 2004, and was expected to be completed in 2005, but a federal judge ruling from Oregon on 31 January 2005 reversed that process. As of 31 January 2005, all wolves downlisted to threatened by the federal government in 2003, were re-listed as endangered, and the de-listing process started for the Eastern DPS was put on hold. Thus the State of Wisconsin currently lists wolves as protected wild animals, but the federal government continues to list as endangered, and any lethal control by the state is possible only with special permits.

The state delisting goal of 250 wolves outside of Indian reservations was initially achieved in 2002, and the state delisting process was finalized in 2004, with wolves designated as protected wild animals in Wisconsin Statutes (NR10.02). The state management goal of 350 wolves outside of Indian reservations appears to have been achieved in 2004, and will lead to more liberal controls to keep the population near 350 once federal delisting is completed.

The present report covers surveys conducted in Wisconsin from October 2004 through March 2005, but some survey information extends from mid September 2004 to mid April 2005. This report documents the mid and late winter wolf population in the state, and represents the 26th consecutive year of these winter wolf population surveys. Also, this was the 10th year that volunteer carnivore trackers were used to assist in winter surveys of the state wolf population.

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METHODS

A territory mapping system (Fuller et al. 2002) was used to determine the Wisconsin wolf population. Radio telemetry surveys were conducted as described by Mech (1974), and were used to determine territory distribution and wolf numbers for packs with collared wolves (Fuller and Snow 1988). Aerial locations were obtained on VHF radio collared wolves about once per week. Wolves were trapped from early May to early September and attempts were made to obtain one collared wolf in about half to one third of the packs in the state (Wydeven et al. 1995, Wisconsin DNR 1999). Movements of collared wolves were assumed to represent the general movements of the pack, and maximum count obtained from the air in mid or late winter was assumed to represent the whole pack. When collared wolves moved outside of known territories in extraterritorial moves or dispersals, the collared wolves were assumed to be traveling by themselves. Wolves were rarely observed from the air in Wisconsin, except during winter when collared wolves were observed about 30% of the time, but during poor snow years, such as 2002-2003, wolves were observed 11% of the time. Pilots made special efforts to visually observe wolves from December through March. Numbers of visual observations were reported for all collared wolves in relationship to total radio-locations during the period of December through March.

Home range areas in the winter period (15 September-14 April) were calculated using the minimum convex polygon (Mohr 1947). Isolated locations more than 5 kilometers (3.1 miles) from other points were considered extra territorial moves (Fuller 1989). Areas between clusters of radio-locations more than 5 km apart were considered part of the home range area if there was regular movements between clusters.

During spring and summer 2003 and 2004, Jason Hawley and Thomas Gehring of Central Michigan University conducted research testing shock collars as a means to deter wolves from specific areas. This system is being tested as a procedure for deterring wolves from areas of livestock concentration. Details of the research findings were reported in Jason's MS thesis (Hawley 2005).

Snow tracking and sign surveys (Thiel and Welch 1981, Wydeven et al. 1996) were used by DNR trackers to obtain counts of wolves in packs without collared wolves, or to supplement survey information for collared packs where few observations were made from the air. Presence of raised leg urinations (RLU's) especially double raised leg urinations (urinations by both alpha male and female) were used to determine territory marking and likeliness of breeding activity (Peters and Mech 1975). Estrus blood in the snow with the RLU's of alpha females further demonstrated likely breeding activity (Rothman and Mech 1979). Breeding status was surmised for some packs based on regular breeding history in the past, or large pack size, and in some cases was determined by observation of freshly excavated den sites in late winter. Surveys were conducted by slowly driving snow covered roads within 1 to 3 days after new snow falls. During a specific survey, as many snow covered roads as possible were followed within specific survey blocks that covered about 200 square miles each (Wydeven et al. 1996, Appendix 3). Roads were followed until wolf tracks were encountered and these tracks were backtracked and forward-tracked to see where they joined and left the road. Separations of packs were
determined by distance between track and sign observations, direction of movements, timing of observations, presence of radio collared packs, historical pack use of an area, and knowledge of focal points such as den sites and rendezvous sites.

Attempts were made to conduct track surveys across most of the heavily forested areas of northern and central Wisconsin. Track surveys were especially focused on areas with historical wolf presence, recent

observations of wolves, or areas of highly suitable wolf habitat (Mladenoff et al. 1995). Although emphasis was on conducting surveys in fairly recent snow, surveys in older snow did allow detection of wolf presence and of wolf breeding activity (RLU's), but older snow was less suitable for precise counts due to vehicle activity, snowplowing, melting-freezing, and perhaps multiple passages by wolf packs.

Along with DNR trackers, volunteer trackers representing other agencies or the general public helped provide additional snow track surveys. This was the tenth year for the volunteer tracking program. Most heavily forested and mixed forest areas were subdivided into 133 survey blocks (Appendix 3, Wydeven et al. 1996). Volunteers were asked to conduct at least 3 "good" surveys per block, and track about 60-100 miles of road. All volunteers were required to attend weekend wolf ecology courses and day-long track training programs.

Public and agency reports on wolf observations were also used for determining wolf abundance and distribution. Such surveys were included in the state wolf count only if verified by experienced trackers, or photos or videos, if available, to verify wolf identification and counts. Track observations were used as part of the state wolf count only from experienced trackers, or from well documented observations (photos, plaster casts, scats collected, etc.).

Wolf packs along the border with Michigan or Minnesota were included in the Wisconsin wolf count if they appeared to have more than 50% of their home range or territory in Wisconsin. Thus some Minnesota and Michigan packs that overlapped only slightly into Wisconsin were not included as part of the state count.

Area of wolf occupancy across the state was determined by summing up the area of all pack territories and multiplying by 1.37 to include 37% interstitial areas around the territories (Fuller et al. 1992). Current year's information on home range was used for collared packs, and the most recent values obtained within the last 3 years were used for previously collared packs. Wolf zone average values for territorial adult wolves were used to estimate area for non-collared packs or packs not collared in the last 3 years,

Pup estimates in packs during winter were determined by change in wolf numbers from previous surveys, knowledge of pup presence from summer howls and observations, and knowledge of pack composition from previously captured wolves. Pup survival was estimated by taking the midpoint of the range of estimated pups in winter, and dividing by the number of breeding females the previous winter, multiplied by 5.2 pups (the mean number of implanted fetuses in 5 adult females examined in Wisconsin in the 1980's and 1990's).

RESULTS AND DISCUSSION

A total of at least 108 packs were detected in Wisconsin in winter 2004-2005, plus 7 lone wolves were found that seemed to occupy regular territories that were residuals of old packs or perhaps establishing new pack territories (Figure 1). Wolf packs were located in at least 31 Wisconsin counties, including 21 counties in northern Wisconsin and 10 in central Wisconsin. Most wolf packs and territories occurred in Zone 1 in northern Wisconsin (94 packs and territories), and Zone 2 in the Central Forest (11 packs and territories), but 9 packs and territories also occurred in Zone 3 (central and western Wisconsin), areas previously considered unsuitable for wolf pack activity. At least 4 of the 9 territories in Zone 3, had been formed by depredating wolves that had been translocated across northern Wisconsin in 2001 and 2002, and resulted after movements of wolves from remote release areas in Zone 1 (Clam River Pack 20, Long Lake Pack 99,

Embarrass River loner 100, and Oconto River Pack 101). Thirty-five of 109 packs (32%) had at least one collared wolf during part of the winter period, but one of these packs was reduced to a lone individual by late winter (Oconto River Pack).

During the winter period, 47 radio collared wolves were monitored in 36 Wisconsin packs, 1 Minnesota pack, and 2 appeared to be lone dispersers (Table 1). Fifteen wolves went off the air during the winter study period, including 8 that died, 5 lost signals, and 2 had collars chewed off.
The 47 collared wolves included, 17 adult males, 22 adult females, 2 yearling males, 1 yearling female, 3 pup males, 1 pup female, and 1unknown animal with snare attached collar. By late winter the wolves remaining on the air included 11 adult males, 16 adult females, 1 yearling male, 1 yearling female, 2 pup males, and 1 unknown wolf.

Mean winter home range area for 31 wolves with at least 20 radio locations was 38.4 $mi^{2,}$ and for 27 adults with 20 or more radio locations was 37.0 mi^2 (Table 2). Average home range in the 3 zones were 42 mi^2 in Zone 1, 31 mi^2 in Zone 2, and 27 mi^2 for Zone 3. Winter home range area ranged from 11 mi^2 for 446F (adult female) who had recently joined the Tranus Lake Pack, to 104 mi^2 for 505F (adult female) of the Bootjack Lake Pack.

Dispersing Wolves

Wolf 462M was caught as an adult male in the Black Lake Pack in Sawyer County on 1 June 2003. After 9 November 2004, wolf 462M began spending time to the south in southeast Sawyer and western Price County, up to 26 miles south of his home territory. The wolf returned to the Black Lake Pack on 13 January and 5 April, but spent time in areas to the south in between. He especially spent time in the Flambeau River State Forest. It appeared that 462M had not completed dispersal by April 2005.

Wolf 454F, adult female, was caught on a farm in Langlade County as a depredator on 19 July 2002, and relocated to the Menominee Indian Reservation on 3 September 2002. Her mate died in fall 2002, and starting winter 2003, 454F began to spend time away from her home range in western Oconto County. On 27 July 2004, she began spending time in western Shawano County, 36 miles west of her home range in Oconto County. Wolf 454F remained in western Shawano County and eastern Marathon County from late summer 2004 to spring 2005, but during the firearm deer hunting season, she did visit the Menominee Indian Reservation. Wolf 454F appeared to be occupying her home range area in Shawano County by herself.

Wolf 474M was captured as an adult male from the Dunbar Pack in northern Marinette County on 19 May 2003. In early 2004 he began extensive movements to south and west, and spent most of the summer of 2004 in northern Portage County, 100 miles to the southwest. After 21 September 2004, wolf 474M began moving to the northeast, and on 5 October 2004, settled into the Oconto River Pack area in Oconto County, 52 miles to the northeast. He settled into a 33 square mile home range area with adult female 452F in western Oconto and eastern Menominee Counties. Wolf 474M continued to occupy this area after 452F was killed on 2 March 2005.

Wolf 479M was captured as a pup male on 23 August 2003 in the Ranger Island Pack of Lincoln County. He left the territory in late March 2004 at 11 or 12 months of age and traveled westward. He spent late spring (19 May - 15 June) and mid summer (3 August-12 August) 2004 in the Green Creek area. Most of early summer was in the range of the Kidrick Swamp Pack (22 June - 27 July). Most of late summer (8

September - 5 October) of 2004 was spent in the area of the Pershing Wildlife Area in western Taylor County. It was not known if other wolves occurred in this area at the time, but a bear hound was injured in this area on 25 September 2004 by a wolf (wolves). Wolf 479M was last detected on 12 October 2004 near Sheldon in Rusk County, 53 miles west of his natal home in the Range Island territory.

Wolf 480M adult male, was captured in the Wildcat Mound pack of Jackson County on 28 August 2004. He was not flown in September, but his home range from 10 October 2004 through 15 February 2005 occurred around the old iron mine east of Black River Falls. After 15 February, 480M began to head westward. He was illegally shot and found dead northwest of Hixton in Jackson County, and 24 miles west of his original capture.

Wolf 496M, adult male, was captured in the South Empire Pack on 9 September 2004, and **Wolf 512F**, adult female, was captured in the North Empire on 7 September 2004. They appear to have joined together to form a new group in fall 2004. The 2 wolves were detected together on 14 December 2004, and appeared to remain together for the rest of the winter in the Lyman Lake area east of the North Empire, north of the South Empire, and west of the Moose Lake Pack.

W509F, female pup, was captured in the Spring Creek Pack in Price County on 26 October 2004 by a coyote trapper. She remained in the Spring Creek territory until mid-February. After that, she began dispersing west and was last located near Exeland in Sawyer County in March. Her collar was found chewed off south of Exeland in mid-March, about 50 mi. west of her capture location.

A **yearling (?) female** wolf was killed in eastern Marathon County on 25 March 2005. Her location was just west of areas roamed by wolf 454F. The yearling female was found dead about 24 miles south of the nearest wolf pack.

An **adult male** wolf was killed by vehicle in Lake County, Illinois on 17 February 2005. The wolf was 1.2 miles south of the Wisconsin border in Kenosha County. The wolf was killed next to the Fox River and had perhaps followed this river from further north in Wisconsin. The wolf was located 152 miles southeast of the nearest wolf pack in Wisconsin, in the Necedah Wildlife Refuge.

This is the second wolf killed in Illinois in recent years. In fall 2002 an adult male wolf was killed near Henry in Marshall County, about 95 miles south of the Wisconsin border. Also in June 2003, a Wisconsin wolf was killed in eastern Indiana, and it would have had to pass through Illinois to reach that location. Thus apparently some dispersal of Wisconsin wolves is occurring through Illinois.

Wolf Telemetry Summary

DNR Pilots detected a total of 146 wolves during the winter period, representing 34% of the minimum estimated wolves (425) in the state in winter (Table 3). In 2004 pilots had observed 27% of the winter population, compared to 39% in 2003.

Percentage of times that collared wolves were observed from the air was 12 % for winter 2004-2005, which was considerably less than the 24 % for winter 2003-2004, but similar to 11% for winter 2002-2003. This figure has averaged close to 30% over recent years, but seems to decline during winters with poorer snow cover. Mean pack size for 28 packs observed from the air was 4.6 wolves (S.D. 2.1), and ranged from 2 to 9 wolves.

Wolf Mortality and Disease

Nineteen or 20 wolves were found dead in Wisconsin in the winter study period 2004-2005; the cut-off collar of Wolf 493M, was found in adjacent Michigan, but this wolf's home range was mostly in Wisconsin (Table 4). Additionally, Wolf 268M of the Truck Trail Pack of western Wisconsin was found dead in nearby Minnesota. Overall mortality included 6 shootings (30%), 1 illegal snaring (5%), 4 vehicle collisions (20%), 4 euthanized at depredation sites (20%), and 5 that appeared to have died from mange (25%). Cause of death among collared wolves was 4 shootings (50%), 1 illegal snaring (12%), and 3 dying from mange (38%).

It appears that illegal kill continues to be an important mortality factor of wolves. Both adult wolves of the Alvin Creek Pack (493M & 504F) of northern Forest County were apparently killed illegally. These 2 were the first wolves trapped and collared in the Nicolet National Forest in summer 2004, and pups were detected with them in mid summer. By late winter 2005, no wolves were detected in the home range area of this pack.

Mange continues to affect certain wolves in the population. All 3 collared wolves in the adjacent Moose Road and Truck Trail Packs died between 21 December 2004 and 18 January 2005 from mange. Wolves dying included 2 adults in the Moose Road (471M & 478F), and the probable alpha male of the Truck Trail Pack (268M) who died on 4 January 2005, after having been monitored through much of his life following his capture as a pup in 1996. The Truck Trail Pack has had a long history of mange and was the first Wisconsin pack from which it was verified in 1991.

Vehicle collisions continue to be an important mortality factor among some wolves, but are not frequently detected among collared wolves, suggesting that it perhaps is a more important mortality factor for wolves dispersing through the state. Euthanizing of depredators will likely expand as the wolf population increases, but because less than 10% of packs in most years cause depredations, only a small fragment of the wolf population will be exposed to this mortality factor.

Wolf Depredation on Domestic Animals

Wolf depredation activity on domestic animals is generally relatively low during the winter period, and only 5 depredation events were reported during the study period (Table 5). Depredations included 3 dogs killed, 1 calf killed, and 1 horse injured that had to be euthanized.
Two dogs were killed near home sites, and one was killed in a hunting situation. Two packs appeared to be involved in the depredation on dogs, and one pack and one loner were involved in livestock depredation.

Three control actions were taken by USDA-Wildlife Services in the winter period, including trapping at 2 farms, and nonlethal controls installed at one farm. Four wolves were euthanized at one farm site from a pack that had been involved in depredation in summer 2004. All lethal control actions were stopped on 31 January 2005, when wolves were re-listed as endangered by the federal government. On 1 April 2005, the U.S. Fish and Wildlife Service issued a special permit to Wisconsin DNR and USDA-Wildlife Services, allowing some lethal control activities to resume.

Reported Wolf Observations

A total of 163 reports of wolf observations that were classified as “probable” or “possible” were received in the winter period (Table 7). Reports of wolf observations were up somewhat from the same period last year when 145 reports were received, but down from 235 reports of wolves in winter 2002-2003 (Wydeven et al. 2004). Wolf Reports were received from 40 Wisconsin counties. Most reports were received from counties with known wolf packs in Zone 1 & 2, but reports were also received from 13 counties within Zone 3 (marginal wolf habitat), and 10 counties in Zone 4 (unsuitable wolf habitat)(Figure 2). Counties with highest wolf observation rates were Iron (16), Marinette (15), and Price (15). Some of the reports of wolf observations in central and southern Wisconsin may be coyotes, dogs, or wolf-dog hybrids, but the death of a wolf in northeast Illinois in February 2005 (see above), indicates that wolves can travel through these highly developed landscapes.

Volunteer Track Surveys

Volunteer trackers returned surveys for 68 survey blocks (89%) of 76 assigned blocks (Table 8). Additional DNR trackers surveyed 73 survey blocks, and the 2 groups tracked 102 of the 133 designated survey blocks in the state. Blocks not surveyed included those surveyed only by radio telemetry, blocks in Indian reservations, and blocks in marginal wolf habitat, with none or few reports of wolf activity. Blocks surveyed included all areas of highly suitable wolf habitat (Mladenoff et al. 1995). Return rates on surveys was higher than 2004 (71%), and 2003 (56%), but total blocks assigned declined somewhat in 2005 compared to 2004 (76 verses 97 blocks). Volunteer trackers detected 195- 214 wolves along 4939.0 miles, and DNR trackers counted 227-243 wolves along 2774.2 miles of survey. Volunteer trackers averaged 3.8 surveys per block, covering 72.6 miles, and 13.5 hours per block.

In 39 survey blocks both DNR and volunteer trackers surveyed wolves. DNR trackers detected 114-121 wolves and volunteer trackers detected 121-134 wolves in these blocks. DNR detected more wolves in 13 blocks, volunteers detected more wolves in 16 blocks, and counts were the same in 10 blocks, including 4 blocks where no wolves were detected. Overall the counts from both groups were similar across the 39 blocks, indicating volunteers are providing suitable counts for estimating wolf numbers.

Statewide Wolf Count

The Wisconsin wolf population estimated in mid to late winter 2005 was 425 to 455 wolves in at least 108 packs or groups, and including at least 14 loners (Table 9, Figure 3). This count represents the minimum number of wolves estimated to be in the state in late winter from a composite of information on wolves from radio tracking, snow track surveys, and reports of wolf observations. We are fairly confident on the count of established packs, but loners and new pairs just starting to establish new territories may be undercounted.

The wolf count in 2004 was 373 to 410 (Wydeven et al. 2004) and using the bottom range of that count, it would appear that wolves increased by 14 %. The population has increased at an annual rate of 20% from 1985 through 2002, but since 2002 has increased annually at a rate of 9%.

The wolf population continued to grow, but at a slower rate than the 1990's. This was also the first time since 1993 that there was not an increase in the number of packs in the state. The pack count in 2005 does not represent the same packs as present in 2004; some packs died out and some new packs developed. Table 10 lists all the packs and territorial wolves detected in the state in 2005.

A total of 414-442 wolves occurred outside of Indian reservations (11 to 13 wolves occurred on tribal land). The management goal for the Wisconsin wolf population is 350 wolves outside of Indian reservations, and thus the population in winter was 64 to 92 wolves above the population goal. Because wolves are currently listed as federally endangered, no population controls can be applied to wolves aside from lethal controls on wolves killing domestic animals on private land. In 2004, 24 wolves were killed at depredation sites, but this mortality apparently had little affect on growth of the overall population. Depredation control activities may slow the spread of wolves into agricultural landscapes.

An estimated 118 to 192 wolf pups born in 2004, occurred in the winter wolf population in late winter 2005. Using the mid-point of 155 pups in the population, and 95 potential breeding packs in 2004, estimated pup survival was 31% statewide. Estimated pup survival was 32% in northern Wisconsin and 26% in central Wisconsin. At least 24 potential pup producing packs (25%), had no surviving pups by late winter.

Average pack size was 3.8 to 4.1 wolves per pack in winter 2005, compared to 3.5 to 3.8 in 2004. Pup survival was estimated at only 26 % in 2004, and perhaps improved pup survival in 2005 accounted for larger average pack size. Packs averaged 3.8 –4.1 wolves in northern Wisconsin and 3.6-3.8 wolves in central Wisconsin. Radio collared packs averaged 4.6 wolves per pack, but this was perhaps biased upward because trapping and collaring more often occur in packs of 3 or more wolves, and capture success is greater in larger packs, but these pack members may disperse and become loners or join other packs. Snow track surveys probably more readily detect newly formed pair bonds, which would keep pack size estimates down.

The area covered by 108 packs and 7 lone territorial wolves was estimated to cover 4652 mi^2. Allowing for 37% interstitial area (Fuller et al. 1992), total area covered by territorial wolves was estimated at 6373 mi^2. Therefore 418 to 448 territorial wolves occurred at a density of one wolf per 14.2- 15.2 mi^2 within occupied wolf range. Area of wolf range and wolf densities across the 3 zones was as follows: Zone 1, 5557 mi^2 at 1 wolf / 14.4 –15.5 mi^2; Zone 2, 346 mi^2 at 1 wolf/ 11.9-12.5mi^2; and Zone 3, 250 mi^2 at 1 wolf / 16.3 mi^2. The 1999 wolf plan anticipated that at least 5812 mi^2 of primary wolf habitat occurred across Wisconsin, and 5015 mi^2 of secondary habitat existed across the state (Wisconsin DNR 1999). Nearly all areas of primary and secondary habitat appear to be occupied by wolves across northwest, northcentral and central Wisconsin, but areas of primary habitat in northeast Wisconsin still have only scattered wolf distribution. Except northeast Wisconsin, wolves seemed to have occupied most of the highly suitable habitat, and are beginning to expand into more marginal areas. Habitat quality was mainly based on areas of low road density, but it appears now that most areas with extensive forest cover across northern and central Wisconsin are able to support wolves.

It appears the wolf population has surpassed the goal for the state, and across much of northern and central Wisconsin, areas of suitable habitat are fully occupied by wolf packs. Although road density was a good early predictor to areas being colonized by new wolf packs in the state, when most of the most suitable areas became occupied, wolves continued to expand into areas of extensive forest cover. In Minnesota it appears that the area of wolf population expansion stopped after about 1998, as wolves reached the edge of extensive forested areas, and areas of extensive agriculture (John Erb pers. comm. 2005). It appears that wolves in

Wisconsin still have additional areas they can occupy in northeast Wisconsin, but further spread of the population in northwest and northcentral parts of the state will be into developed and agricultural areas, where there will be higher levels of conflict. This has been illustrated by a rapid increase in farms involved in wolf depredation from 8 in 2002, 14 in 2003, and 22 in 2004. Until federal delisting occurs, lethal control at depredation sites will be the only population control available to the Wisconsin DNR. It is hoped that the federal delisting process will be completed sometime within the next year.

PLANS FOR NEXT SEASON

Live-trapping and radio-collaring of wolves will be done by the WDNR from early May through early September. The second study by Central Michigan University will examine use of shock collars as a means for reducing livestock depredation. John Shivik with USDA-Wildlife Services will initiate a study on 2 or 3 farms to determine calf mortality, and determine how much of "missing livestock" are due to wolves and other predators by following radio collared calves. USDA-Wildlife Services will investigate all possible wolf depredations and determine appropriate lethal and nonlethal controls to reduce wolf depredation. Wolves found dead in the field will be taken to the National Wildlife Health Center or DNR Wildlife Health Lab for necropsies. State officials will work with officials from Michigan and Minnesota DNR's and U. S. Fish and Wildlife Service to resume and complete the delisting process for the Western Great Lakes.

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Note: This report is a preliminary report and should not be construed as a finalized publication. Some of the numbers of pack sizes, composition, population figures, and other information may change, as more data becomes available. Persons wishing to cite figures within the report should consult the author.